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#### How to cite:

Ferguson, Rebecca; Faulkner, Dorothy; Whitelock, Denise and Sheehy, Kieron (2015). Pre-teens' informal learning with ICT and Web 2.0. *Technology, Pedagogy and Education*, 24(2) pp. 247–265.

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Version: Accepted Manuscript

Link(s) to article on publisher's website:

<http://dx.doi.org/doi:10.1080/1475939X.2013.870596>

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Journal:	<i>Technology, Pedagogy and Education</i>
Manuscript ID:	RTPE-2012-0059
Manuscript Type:	Original Article
Keywords:	informal learning, pre-teens, ICT, primary, evaluation

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**Pre-teens’ informal learning with ICT and Web 2.0**

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## Pre-teens' informal learning with ICT and Web 2.0

ICT and Web 2.0 have the potential to impact on learning by supporting enquiry, new literacies, collaboration and publication. Restrictions on the use of these tools within schools, primarily due to concerns about discipline and child safety, make it difficult to make full use of this potential in formal educational settings. Studies of children at different stages of schooling have highlighted a wider range of ICT use outside school, where it can be used to support informal learning. The study reported here looks beyond the broad categories of primary and secondary education and investigates the distinctive elements of pre-teens' use of ICT to support informal learning. Nineteen children aged 10 and 11 participated in focus groups and produced visual representations of ICT and Web 2.0 resources they used to support their informal learning. Thematic analysis of this data showed that pre-teens respond to a range of age-related constraints on their use of ICT. Inside formal education, these constraints appear similar at primary and secondary levels. Out of school, regulation is more age specific, contributing to the development of tensions around use of ICT as children approach their teenage years. These tensions and constraints shape the ways in which children aged 10 to 11 engage in formal and informal learning, particularly their methods of communication and their pressing need to develop evaluation skills.

**Keywords:** evaluation; informal learning; ICT; pre-teens; Web 2.0

## Introduction

Use of digital technologies is now widespread in schools. In England, as in many other countries, the preferred term for these tools since the 1990s has been information and communication technology or ICT, and schools are currently required to use ICT to teach children aged 8 and above in all statutory subjects except physical education (Department of Education, 2012; Selwyn, Potter, & Cranmer, 2010). This educational policy is, in part, technology driven, focused on keeping up with technological changes in society, keeping up with children's out-of-school experience and meeting public expectations that children will learn to use these technologies (Selwyn, et al., 2010).

Potential pedagogical benefits for learners were identified by a large-scale study of Web 2.0 technologies at English secondary schools (Crook et al., 2008; Crook, Fisher, Graber, Harrison, & Lewin, 2008; Crook & Harrison, 2008). Although Web 2.0 – also known as the participatory web or the read/write web – and ICT are not synonymous, they are inextricably intertwined now that a wide range of devices are web enabled, including computers, smart phones, games consoles and MP3 players. Crook and his colleagues highlighted the potential of these technologies to support learner *enquiry*, to offer new modes of representation and expression requiring *new literacies*, to support innovative thinking and problem solving through *collaboration* and to allow *publication* of work to an authentic external audience (Crook, 2012; Crook, Cummings, et al., 2008).

However, significant barriers make it difficult to make use of ICT’s full potential to support enquiry, new literacies, collaboration and publication within formal education at primary or secondary level. Technology is expensive and requires frequent updates and maintenance, the associated skills must be updated frequently, schools lack the bandwidth necessary for all children to be online simultaneously, and concerns about child safety prompt restrictions on web access (Byron, 2008; Crook, Fisher, et al., 2008; Selwyn, et al., 2010). Responses to the perceived risks in online environments typically include a bar on access to a variety of online sites and networking tools by schools and local authorities, thus restricting opportunities for children and teachers (Ching & Hursh, 2010; Livingstone, Haddon, Goñizig, & Ólafsson, 2010; Schome Community, 2007).

These limitations do not necessarily apply outside school when young people engage in ‘informal learning’ in which they control both the goal and the process of their learning (Clough, 2009; Vavoula, 2004). At home, young people aged 8–21 ‘are able to draw on a whole range of “informal learning practices” in ways that can make that learning potentially much richer, much more personally fulfilling for them’

(Furlong & Davies, 2012, p59). It is clear that teenagers use Web 2.0 tools to support their informal learning (Erstad, 2012; Luckin et al., 2008), with the constraints being access to technologies and technical expertise, coupled with networking and collaborative skills (Furlong & Davies, 2012).

Little is known, however, about how pre-teens use these tools to support their informal learning. This is an issue, because research into secondary school pupils' use of social media has pointed to significant differences in use according to age (Crook & Harrison, 2008), while studies of Internet usage trends show that children are going online younger and that there are significant shifts in ICT use according to age (Livingstone, et al., 2010). 'ICT use is heavily age-dependent, even within the relatively limited age range of Key Stage 2 [ages 7–11]' (Selwyn, et al., 2010, p150). Around a quarter of children in Europe aged nine to ten have a social network profile, compared with half the children in the 11 to 12 age group (Livingstone, et al., 2010). In the UK, 20% of eight year olds chat online, compared with 48% of 12 year olds (Furlong & Davies, 2012).

These figures imply that accounts covering several year groups, such as the extensive study of primary schools and ICT which collected data from 612 children aged 7 to 11 (Selwyn, Potter, & Cranmer, 2009; Selwyn, et al., 2010), the two-year BECTA-funded study of over 1000 young people aged 8–21 (Furlong & Davies, 2012) and the recent ESRC-funded seminar series focused on adolescents (Coleman, 2012), need to be supplemented by more fine-grained studies separating out the experiences of children at different ages (Grant, 2010). Such an approach would make it possible to 'analyse the exchanges between everyday practices and the encompassing cultural and societal structures ... not los[ing] track of the bigger picture while allowing deep

explorations into micro-practices of everyday life’ (Berker, Hartman, Punie, & Ward, 2006, p6).

The research reported here contributes to this research process by focusing on a specific age group in order to address the question:

- What is distinctive about pre-teens’ use of ICT to support informal learning?

**Research method**

In order to investigate a wide range of informal learning practices, a purposive sample of 10 and 11 year olds was recruited from groups of children at a primary school in England who were known to participate in informal learning involving the use of ICT and Web 2.0. These included children who built robots using *Lego Mindstorms* at a parent-run after-school club; and members of a lunchtime club run by children who enjoyed using the *Scratch* programming language. Thirteen boys and six girls from these groups volunteered to participate.

BERA Ethical Guidelines (2011) were followed throughout this study. Both children and parents / guardians were given full details of the study and of the children’s right to withdraw at any point. All participants and their parents / guardians signed a consent document that explained the project and assured confidentiality and anonymity. In this article, the children are referred to by pseudonyms appropriate to their gender and ethnic origin.

In order to explore the children’s views, opinions and understandings, they participated in focus groups of three or four, the recommended size for children of this age (Kennedy, Kools, & Krueger, 2001). Focus groups typically lasted around 45 minutes and included both individual responses and group conversations. A semi-structured approach allowed the researcher to offer flexible responses to emerging



1  
2  
3 themes. All children were invited to produce visual representations of the ICT and web  
4  
5 tools they had used at home when seeking an answer or solution; other researchers  
6  
7 studying ICT use by primary children have used a similar combination of spoken and  
8  
9 visual contributions (Grant, 2010; Selwyn, et al., 2010). Asking children to express their  
10  
11 thoughts and feelings about issues within a focus group that incorporates drawings has  
12  
13 the potential to support children who do not write or speak confidently and can  
14  
15 stimulate and improve the verbal contributions that they make (Morgan, Gibbs,  
16  
17 Maxwell, & Britten, 2002). Offering drawing materials stimulated discussion, allowed  
18  
19 children to use visual representations to support their verbal descriptions, and  
20  
21 encouraged them to think in detail about tools and settings. The method also supported  
22  
23 triangulation between groups and between spoken and illustrated accounts.  
24  
25  
26

27  
28 In order to focus on informal learning rather than on schoolwork or homework,  
29  
30 questions referred to finding things out, rather than to education or learning. Children  
31  
32 were asked to think of a recent occasion when they had wanted to find something out  
33  
34 using some sort of technology. Examples they selected included:  
35  
36

- 37 • 'How to install a font onto my computer and put it onto *Microsoft Word*'
- 38 • 'How much the new book by Stephenie Meyer cost.'
- 39
- 40
- 41

42  
43 In each of these cases, the children had set their own goals for their  
44  
45 investigations. In order to explore the process of their learning and the constraints they  
46  
47 experienced, the interviewer encouraged them to describe and draw how they had gone  
48  
49 about their investigation, including the context in terms of location, people and  
50  
51 resources. After they had done this, they were asked to reflect on how this differed from  
52  
53 their experience at school. Finally, they were asked which programs and websites they  
54  
55 would recommend to a first-time computer user.  
56  
57  
58  
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60

Recordings of the focus groups were transcribed and thematic analysis was applied to transcripts of five focus groups involving 14 children (others were not transcribed due to technology failure). In all, the five transcripts included over 34,000 words. The data that was analysed also included 14 A2-sized drawings produced by the participants (see, for example, Figures 1, 3 and 4). These images were used as additional resources to support understanding of the transcripts.

Three coders carried out thematic analysis, coding sections of transcript data individually, then discussing their individual responses to conversational turns and agreeing codes for these. The illustrations were used to identify additional coding categories, as a source of additional data, and as a means of triangulating the findings from the transcripts.

There were two phases of analysis. The first used thematic categories grounded in the data in order to explore distinctive elements of pre-teens' experience. The material from each group was condensed through identification of key phrases and representations; emerging themes were identified; and the key phrases and images emerging from each group assigned to those themes (Sheehy & Bucknall, 2008; Tindall, 2001). The second phase of analysis focused on use of ICT and Web 2.0 to support informal learning. It therefore employed as coding categories the four broad forms of impact of Web 2.0 in the context of learning identified by Crook and Harrison (2008): enquiry, new literacies, collaboration and publication. After preliminary analysis and discussion of the results, 'evaluation' was added as a category, because this was found to be an important feature of children's investigations.

**Distinctive elements of pre-teens' experience**

Analysis focusing on themes grounded in the data identified four age-related constraints on use of ICT and Web 2.0 for pre-teens.

- (1) Finance
- (2) Access to technology
- (3) Adult monitoring, censorship and age restrictions
- (4) Limits on skill and comprehension

### ***Finance***

The children all had access to ICT and Web 2.0 at home, but their low personal income restricted their use of various technologies and services. As Elsa pointed out, ‘At my age you don’t get lots and lots of pocket money’. Their limited financial resources had a strong influence on their choice of communication technology, they preferred to use *Windows Live Messenger* (also referred to as *MSN*) because using phones to call or text was more expensive.

Grace: *Windows Messenger* is better because you can actually talk to them rather than phone because the phone actually costs money whereas *Windows Messenger* is absolutely free

Kiri: if you have aunts or uncles who live in another country and you don’t want to waste lots of money trying to text them or call them you could just jump on *MSN* and talk to them, and that’s what I do

Laura: *MSN*, it’s free. I prefer to do that than text.

These quotes from three different focus groups are supported by other references: 11 children referred to *MSN* and seven of these included it in the pictures of their investigations (see, for example, the screens in Figures 1 and 3). In contrast, only six children mentioned phone use, and phones appeared in three pictures. This was comparable to email use (mentioned by seven, two pictures) and far ahead of *Skype* (mentioned by two, one picture).

As well as having a restricted income, being too young to have a debit or credit card meant the children’s online purchases had to be mediated by adults. Figure 1 shows

what a strong impact this could have in terms of prompting an enquiry, carrying out an enquiry and the context of the enquiry. Elsa was one of two children to report on a price-comparison investigation. In both cases, the aim was to identify the cheapest price for an item in order to persuade a parent to buy it – Elsa’s father and his purchasing power loom large on the left of Figure 1. These online comparisons were detailed: Elsa’s picture shows her visiting four sites – Amazon, HMV, Play.com and Game – in search of book prices, she also mentioned checking the price in Waterstones bookshop both online and in the local shopping centre.

Insert Figure 1 here

Figure 1: Elsa: Visiting a variety of sites to find the best price available for a book purchase

*Access to technology*

Elsa was working on her own computer, but for most of the children ownership of technology was a complex issue. Four children stated that they owned their own laptop or netbook, but three of them also shared computers.

Kiri: This is my laptop. My mum’s got two laptops and we’ve got a big one upstairs and so when my sister and me want to link up in *Club Penguin* or something she just goes on the big one upstairs

The majority only had access to shared computers, and their patterns of computer sharing were often complex.

Dylan: I have about five computers in my own house. My mum has her school laptop which I can’t use, but me and my sister have a laptop that we use for homework so we can do our homework on that, but it’s not very good because it’s a really slow one. So then we’ve also got a computer which is here like next to the kitchen, it’s like our library really, ’cos there’s loads of books. So then, upstairs we

1  
2  
3 have another computer but we can't use it because my dad's usually working and  
4 we can't really touch it.  
5  
6

7  
8 Sometimes software was only available on certain computers: Ethan only had access to  
9  
10 *iTunes* on one computer, and Elsa was barred from installing *MSN* on her father's  
11  
12 computer because 'his computer caught a virus from it'.  
13

14 The need to share affected the children's online activities in other ways. Physical  
15  
16 access was an issue. Ethan reported that his younger sister 'tries to push me off the chair  
17  
18 so she can have a go on the computer'; Manvinder pretended to be doing homework, so  
19  
20 his brother could not use the computer. Chris reported the use of more extreme  
21  
22 methods; his parents  
23

24  
25  
26 don't trust my sister with [their computer] because she downloads viruses so that  
27  
28 she can use my dad's laptop.  
29

30  
31 When sharing did take place, three children described ways of concealing activity.  
32

33  
34 Chris: If your mum's like, 'Why haven't you done your homework?' and stuff, and  
35  
36 you say you've done research and you've deleted it so your sister can't see; she'll  
37  
38 look at the history and say, 'There's no website up here.'  
39

40 David and Ryan extended this discussion by explaining how to delete both browser  
41  
42 history and bookmarks, and Chris went on to assert that his sister could conceal her use  
43  
44 of *Facebook* and *MSN* because she knew a 'glitch, which makes them invisible'.  
45  
46

### 47 48 ***Adult monitoring, censorship and age restrictions*** 49

50  
51 Checking browser history was just one of the ways in which the children's ICT use was  
52  
53 monitored. Laura reported that  
54

55  
56 I always have the door open because my parents don't think it's very good to go on  
57  
58 the computer on your own  
59  
60

Her illustration included a door standing open so ‘people can check on me every now and again’. Manvinder had to keep *MSN* running (see Figure 3) while his mother was at work

I’ve got to keep her in so because she could think like, ‘Oh no, what’s happened to Manvinder?’ and it’s going to be like really fraught.

Parental scrutiny of *YouTube* use appeared to be particularly intense, mentioned in three focus groups. Nine of the children reported using the site and none reported that it had been banned at home, but some children’s use of the site was monitored:

Laura: I have to have someone supervising me when I go on *YouTube*.

Kiri: I went on the site, obviously with my mum’s permission

Joel: Mum and Dad can control it and Mum and Dad can sometimes even tell you to get off it and stop doing it.

Monitoring within the home was bolstered by reference to official age ratings on computer and video games and by use of the parental controls on games consoles and computers, which employ a similar set of age restrictions and can be used to restrict access to games, apps and websites. An exchange between David, Ryan and Chris demonstrates some of the tensions that emerge when material is rated at international level, but the ratings have to be implemented within the home.

Ryan: It’s really a 12 and I put it in my Wii and it wouldn’t allow because we only did up to 7s I think we did.

David: Yeah, because of [your younger sister,] Sally.

Ryan: Because of Sally and now we’ve moved it up to, like, I think it’s 12 because I’ve got *Half Blood Prince*

Chris: Yeah, I’ve got that, my grandma was really efficient and my uncle got me it because I wanted *Harry Potter Lego* he got me *Half Blood Prince*.

Ryan: What, on the Wii?

Chris: Yeah and my grandma was like, ‘Oh, no, you can’t have that, it’s 12’

David: Well I don't care, I play 16s, I play 16s.

Chris: And it was my eleventh birthday

Ryan: I play 18s,

Chris: I play *Modern Warfare 2*.

All three boys were aware of the age-rating system run by Pan European Game Information (PEGI), and refer to four of its five categories: 7, 12, 16 and 18. They knew the age rating for each game they mentioned, and they presented this as shared knowledge. In their accounts, not all adults shared this awareness, and not all adults remained within the guidelines. Chris's uncle did not distinguish between games rated 7 and 12. Ryan's mother at first set the parental controls on the Wii for his younger sister, and then amended them so he could play a game rated 12 on his eleventh birthday. Gaining access to age-restricted material was obviously a matter of pride for these boys – Chris started this section of the discussion with his request for a 7-rated game and ended with the claim that he plays an 18-rated game. The dividing line between accurate reporting and boasting is unclear to the reader and was probably unclear to the boys themselves.

Similar tensions emerged around access to social media sites. These are not subject to the same official censorship, but often impose age restrictions. Six of the children made reference to using social media sites aimed specifically at children, *Club Penguin* and / or *Moshi Monsters*. For child protection reasons, both sites offer restricted communications options. Half the children's comments situated use of these sites firmly in the past, suggesting they were growing out of them. 'I haven't been on *Moshi Monsters* for ages 'cos I found it really boring', commented Ethan.

In current social media terms, the next step would be a move away from moderated conversations and on to *Facebook* – but *Facebook* membership is only open to people aged 13 and over. Three of the girls discussed this option. Laura had not been

allowed to make the move; ‘it can be dangerous, even though I know I’d be sensible.’ Rachel had joined, with parental agreement, ‘My mum does let me on *Facebook*’. Elsa was also a *Facebook* user, but her communication options were still restricted because ‘some of my friends don’t have *Facebook*’. As with games, the apparently rigid official age restriction was a permeable boundary in practice – not all parents enforced it and not all children accepted it – but it did limit options for communication.

***Limits on skill and comprehension***

Only three children made direct mention of a final age-related constraint on technology use, their choice of sites based on understanding. Rachel would filter her *Google* searches, Joel would avoid *Wikipedia*, and Dylan struggled to use *Wiki Answers*:

Rachel: I like to tick the ones that say like a kids’ one, because sometimes they go onto adult websites and it’s quite hard to understand what it means.  
Joel: You can also go on *Wikipedia* but it’s all long and boring and I can’t be bothered to read it.  
Dylan: my cousin uses [*Wiki Answers*] but I don’t really know how to use it

Despite the low number of explicit references to this theme, the children’s descriptions of online activity demonstrated gaps in skills and knowledge that became more evident in the second phase of coding.

***Pre-teens’ use of ICT to support informal learning***

This second phase of coding focused on the children’s reports of their informal learning, and on whether they were able to use ICT and Web 2.0 to support *enquiry*, to employ new modes of representation and expression requiring *new literacies*, to support innovative thinking and problem solving through *collaboration* and to allow *publication* of their work to an authentic external audience



None of the children had difficulty in identifying recent occasions when they had engaged in investigations outside school. Of the 14 children, 10 chose to report examples of informal learning, occasions when they had used ICT to investigate a question of personal interest, selecting their own tools and goals. Four children chose to focus on formal education – a homework task – but also made reference to informal learning that had involved use of ICT.

### ***Enquiry, literacies, collaboration and publication***

In terms of skills and tools employed, Manvinder and Ajay reported the most sophisticated project (see Figure 2 for a scene from their completed work), a project using the *Scratch* programming language that involved enquiry, new literacies, collaboration and publication.

Manvinder: Me and Ajay did like a joint thing on *Scratch* so I sent Ajay some *Scratch* projects so that Ajay could put them, could record them and then put them up on *YouTube*... I made the project while Ajay just waited, then I emailed it to Ajay. Ajay asked me some questions before videoing it because he'd got [access to a screen recorder] and I don't.

Insert Figure 2 here

Figure 2: Animation programmed in Scratch by Manvinder and Ajay and then uploaded to YouTube

Originally, the boys were going to include sound effects,

Manvinder: but then we decided not to because it would have made it sound better or look better if there wasn't sound in the background; that distracts the viewer.

They collaborated using *MSN* and email, before Ajay reviewed the final version, 'I said it was brilliant; I just made a few spelling changes and some general things', and shared

it publicly on *YouTube*.

This project began with the boys’ use of the programming language *Scratch*, which they had sourced and learned to use outside school. It also involved finding and using appropriate tools, collaborating both online and offline over several days, evaluating and revising their work in different media, and publishing their final version.

Although all the children interviewed reported that they had engaged in online enquiry and discussion, only five reported online publication. Four had shared *Scratch* projects online. Kiri had shared an online video, and had shared an edited version at school

Kiri: I had taken loads and loads of videos and pictures in Switzerland of the mountains and they were really exciting so I asked my Dad if I could make like a film of all of them, one film like a slide show [...] my film lasted two hours and we spent about five weeks making the film

All the children’s publicly available published productions were collaborative and had taken days or weeks to complete. Productions created for a more limited audience also engaged them over extended time periods. Two children reported investigating the price of books, and sharing their findings with people likely to buy the books for them. Elsa’s investigation was considered in the Finance section above (see also Figure 1); Manvinder’s account details how a seemingly simple question developed into an extensive enquiry (Figure 3).

Insert Figure 3 here

Figure 3: Manvinder compares prices online, chats on MSN and charges his iPod and Nintendo DS while his brother (top right) watches television nearby

Manvinder: I was looking for what I want for my birthday because I already knew that I only knew to save it on my computer so and my mum could see it and go on.

I was just looking for the cheapest prices. So I looked on Waterstones and WH Smith.

He explained that he created a price comparison grid and saved this as a *Word* document.

Manvinder: My mum doesn't really go onto websites which you have to look on. I go to the shops quite a lot – Waterstones and WH Smith [...] and I was originally thinking of using HMV but they don't do books [...] A few of the children in my class had read the book [*Vampire Blood* trilogy] and they said it's really good. So I'm reading them at the moment and they are; that's when I knew what to expect. I'd go on a couple of sites, just to check... I always looked for the smallest amount of money... for general round I use *Amazon* but for games I use *Game* or *Play.com* and for books usually *Waterstones*... I show [my mum] a recording what the prices were, 'cos every few days I check for prices. They go up and down

This is a more mundane activity than programming and filming an animation, but it still makes use of Web 2.0 strengths in terms of learning. Manvinder's enquiry draws on personal experience and shows an awareness that findings change according to time and context. It involves collaborating with friends and parents. The final production that emerges from this process of informal learning is sophisticated and specifically tailored for its audience in terms of the concerns, likely behaviour and preferred tools of that audience. Overall, the enquiry requires a great deal of evaluation – of sites, information, presentation methods and likely audience reaction.

All three data coders found that analysis of the themes of enquiry, new literacies, collaboration and publication indicated that these elements were entangled with evaluation, so this was added to the data analysis as an additional coding category.

### ***Evaluation of tools and resources***

The children all reported evaluating tools and resources. Their main resources for doing

1  
2  
3 this were personal experience, peers, family and friends. They used comparison and  
4  
5 experimentation, extended social networks and, less commonly, advice from school or  
6  
7 teachers. As discussed above, they also all reported experience of external evaluation –  
8  
9 sites or tools that were blocked by age rating, by parental control, by their school or by  
10  
11 teachers.  
12

13  
14 A problem the children encountered when evaluating tools and websites was that  
15  
16 they did not fully understand warnings that they had been given. There was general  
17  
18 agreement that *Wikipedia* could be unreliable  
19

20  
21 Chris: *Wikipedia* isn't true  
22

23 Rachel: If I go on *Wikipedia*, I look on another website because anyone could put  
24  
25 something on so it could always be wrong so if I do something on *Wikipedia*, I'll  
26  
27 paste it onto like *Word* and then check on other websites to see what they've put in  
28  
29 it is true.  
30

31 However, although *Wiki Answers* and *Yahoo Answers* also have multiple authors  
32  
33 and have less stringent review and attribution guidelines than *Wikipedia*, the children  
34  
35 did not question the accuracy of these sites unless they knew from personal experience  
36  
37 that the information they found there was inaccurate.  
38

39 The three participants in one focus group were a friendship group. In their  
40  
41 responses, they wove together urban myths and criticisms of the Internet.  
42  
43

44  
45 Ryan: There was this website that I went onto and it's been shut down now cos of  
46  
47 what it was doing. It was popping up with subliminal messages really quickly and  
48  
49 it said things like  
50

51 David: Things that we can't mention, Yeah sort of like rude.  
52

53 Ryan: Was it rude?  
54

55 David: Like racist things  
56

57 Ryan: Like become a terrorist or something, I don't want to do that.  
58

59 David: Because like you couldn't see it pop up but you just you could think it in  
60  
your mind.

These concerns were sources of excitement, concern and danger, but depended on a partial understanding of online events and formed a poor basis for evaluation. Although group members did evaluate the sites they visited, they had not developed effective methods of doing this – as shown by their discussion of the information represented in Figure 4.

Insert Figure 4 here

Figure 4: David used Wikipedia, Ask Jeeves, YouTube, the BBC and Wiki Answers to investigate whether a singer had been arrested. He reported that only the BBC had given the answer ‘No’

David was investigating whether the lead singer in the American punk band Green Day had ever been arrested. He visited many sites, which appeared to give him conflicting answers. He decided to trust the information provided by *Wiki Answers*, a wiki-based site that includes numerous contributions from children and teenagers.

Interviewer: Why was it that you decided that *Wiki Answers* had given you the right answer? For example, the BBC had given you the wrong answer?

David: Well, I knew, I know that the BBC don’t really listen, care really.

Ryan: Yeah,

David: They didn’t really care about it because they said ‘if you want to know more, go to...’

Ryan: ‘Such and such’

David: Yeah.

Ryan: They do that really.

David: Yeah, but then I went to *Wiki Answers* and I’d been on *Wiki Answers* before for many things and I’d been trusting *Wiki Answers* for quite a bit and I went on to it and I just wanted to know when and why he was arrested basically, just in case there was some back history.

Chris: I don’t really like [the search engine] *Ask Jeeves* because on the radio advert and the TV advert, they say that he knows everything.

Ryan: He doesn’t!

Chris: They're asking him questions and he says 'Ask Jeeves' and then when you go to it, he's not the actual one that knows it 'cos you click on it and he gives you web links, it doesn't actually tell you.

Ryan: But it does show you that.

Chris: Sometimes it shows you, but it's not always true.

Although this group enthusiastically engaged in online enquiry and collaboration, opportunities for informal learning were limited by its members' lack of understanding of how to judge the reliability of sites and the information supplied on them. Despite the obvious clue in the names, the boys did not appear to be aware that *Wiki Answers*, like *Wikipedia*, is a wiki, nor did they seem to know of safeguards that can be put in place to increase the credibility of such sites. They were too young to recognise 'Jeeves' as a reference to Wodehouse's infallible butler, so interpreted the bowler-hatted man they saw in the television advert as the individual who would supply the results on the *Ask Jeeves* search engine. This demonstrated a lack of understanding of how search engines work, and also implied an ignorance of how search engine rankings are derived.

**Discussion**

The data analysis revealed a series of factors that combine to make pre-teens' use of ICT distinct from that of either younger children or teenagers. These are summarised in Figure 5. Age ratings for video games, websites and applications apply at an international level. The age ratings of the American-based Entertainment Software Rating Board (ESRB) have worldwide significance, because they form the basis for parental controls on consoles such as the Wii and Kinect and can thus limit access to websites and applications. ESRB sets age divisions at 10 and at 13, with one game in five rated 'Everyone 10+' and one game in four rated 'Teen' (ESRB, 2011).

European children aged under 12 can officially access approximately only half of all PEGI-rated video games, reaching the age of 12 increases that access to 74% of all rated video games (PEGI, 2012). Increasingly, these games include Web 2.0 elements, including shared communication features and content creation options. Reaching the ages of 12 and 13 is thus associated with significant changes in children's access to these resources.

The age of 13 is also significant for access to social media and to earning capacity. Although children's social media sites are open to a wide age range (6 to 14 in the case of *Club Penguin*), this study indicated that children are beginning to grow out of these sites by the age of 10, while the currently predominant social media site, *Facebook*, currently restricts membership to those aged 13 and over. Thirteen is also the age at which UK children are first able to boost their earning power by taking paid employment.

Alongside these laws and official guidelines, other shifts take place more gradually: adults decrease their oversight of online activity, children gain more access to and control over ICT, and increases in skill and comprehension extend the range of tools and resources they are able to use. The sharp dividing line between primary and secondary school (at age 11 in England) that shapes the design of so much research into children's learning is of little significance in the context of ICT use outside school, whereas age-related constraints are significantly reduced at the age of 13.

### Insert Figure 5

Figure 5: Constraints on pre-teen use of ICT and Web 2.0. The four rows at the top of the figure include vertical lines indicating age-specific changes in restrictions, the lower three rows represent gradual changes as children approach adulthood.

These constraints are associated with a series of tensions. Children reported the use of both fighting and deception to gain access to ICT and Web 2.0 at home.

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3 Deception ranged from misrepresenting what they were doing to siblings, through  
4 deleting records of online activity, to ignoring age restrictions and lying about their age  
5 on social media sites. In some cases this was supported by adults, who had bought them  
6 software restricted to an older age group, relaxed parental controls or agreed to them  
7 joining *Facebook*. This is in line with US findings that a third of 11 year olds are on  
8 *Facebook* and that almost all parents who know that their child is violating minimum  
9 age restrictions believe such violations to be acceptable (boyd, Hargittai, Schultz, &  
10 Palfrey, 2011).  
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21 In their informal learning outside school, the children were able to harness Web  
22 2.0's potential (Crook, 2012; Crook, Cummings, et al., 2008) to support both small-  
23 scale and longer-term personal enquiry, to collaborate with friends and relations, to  
24 develop multimodal literacies related to the use of video, audio and programming and,  
25 in some cases, to publish their creations. They moved between different tools and  
26 resources to achieve their goals, connecting with friends and relatives as they did so.  
27 Age-related factors shaped some of their enquiries, prompting investigations of prices  
28 and comparison of different websites. Age-related limitations were more constraining in  
29 the case of digital literacies, publication and collaboration. The children's opportunities  
30 to develop digital literacies and to publish text, images or videos online were limited by  
31 restrictions on their use of Web 2.0 sites.  
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45 In the case of collaboration, synchronous communication was a priority for the  
46 children. All five focus groups were clear that they would recommend *MSN* or  
47 *Facebook* to a friend who had just acquired their first computer. Their choice of  
48 communication method was influenced both by lack of access to technology (Selwyn, et  
49 al., 2010 found that less than half children this age had access to a mobile phone) and  
50 lack of finance.  
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3 These restrictions were particularly telling in the case of evaluation. The  
4 children's use of Web 2.0 involved repeated evaluation of information, tools and  
5 resources. When engaged in informal learning, the children did not have predefined  
6 resources to support their inquiries and so their explorations took them to pages and  
7 sites they had not visited before. Their key strategies for evaluation of these resources  
8 were interpersonal communication and comparison. Communication was mainly  
9 restricted to friends and family and was limited to the knowledge available in that  
10 network. Comparison worked well when children had a method of testing or applying  
11 their results, for example when evaluating prices, but otherwise they experienced  
12 problems in determining whether sites or information were reliable and trustworthy.  
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15 The children's evaluations were limited by poor understanding of how key  
16 online sites worked. In particular, there was some confusion about the use of search  
17 engines, which at least three children expected to have strong natural language  
18 processing abilities. They also lacked understanding of guidelines imposed by adults.  
19 The unreliability of *Wikipedia* had obviously been stressed to them, and was explicitly  
20 mentioned by two focus groups but none of the children appeared aware of measures in  
21 place to increase the site's reliability, and they did not generalise the guidance they had  
22 been given to include other jointly authored sites, such as *Wiki Answers*.  
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25 Children's discussions revealed a disjuncture between learning formally and  
26 informally. At school, some sites and tools were restricted or not available.  
27 Communication tools, such as *MSN*, which they commonly used to support  
28 collaborative learning outside school, were not available in school. Some children saw  
29 this as a sensible decision, 'We're there to learn and not to chat with your friends'. They  
30 did not reflect on the irony of this, given that their self-directed learning experiences  
31 outside school involved almost continual communication with family and friends.  
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Both at school and at home, the children had experience of the consequences of evaluations that had been carried out by others without clear explanation. They knew that the use of several sites was banned within school, but were not sure which sites were covered or why. Use of other, key, out-of-school enquiry tools was similarly blocked or discouraged inside school. Some thought this a good thing. ‘*Wikipedia* isn’t true’; *YouTube* includes ‘inappropriate videos’ and ‘can come up with some things that we shouldn’t be looking at in school hours’. Yet tools they used enthusiastically to support informal collaboration and enquiry – particularly *YouTube* and *MSN* – were banned inside school. Their out-of-school experience was not consistent with formal education’s broad-brush sanctions.

A look at Figure 3 underlines the difference between the resources available to the children inside and outside school. In his illustration, Manvinder engages in a mundane price comparison and, in doing so, makes use of a wide range of resources. Within school, though, he would not have had access to *MSN* or any other computer messaging system, to online chat via his games console, to interaction with children in other rooms, to soundtracks or podcasts or to *YouTube*. He would also have been discouraged from visiting online shopping sites. Of the rich array of tools and resources depicted in Figure 3, he would have been left with just *Google*. In terms of ICT usage, school would have deprived him of all his communication technology and he would have been left using just IT.

***Rigour and possibilities for future research***

Before considering the significance of this study in terms of its implications for practice and for future research, it is necessary to consider both its rigour and its limitations. In the case of qualitative research that takes context into account, this involves consideration of the issues of credibility, confirmability, dependability and

transferability (Trochim, 2008). Credibility involves establishing that the results of the research are credible from the perspective of the participant; the analysis reported here therefore includes categories developed from and grounded in the data from five focus groups. Confirmability refers to the degree to which results could be confirmed or corroborated by others, and the research design therefore required agreement between three coders, and triangulation between focus groups and between spoken and illustrated accounts. This triangulation contributed to the dependability of the research; the extent to which it can account for the context in which it takes place. A possible limitation in this area is that children would be wary of revealing wrongdoing, so may have under-reported their use of deception to gain them access to ICT and Web 2.0.

The transferability of research refers to the degree to which it can be generalised to other contexts or settings. This study's use of a small, purposive sample was necessary in order to identify a broad range of significant themes, but such a sample limits the transferability of the results, and this points to possibilities for future research. The current study focused on primary-school children, a follow-up study would cover pre-teens in secondary education and would be able to consider in more depth the differences between age groups and between formal and informal settings. As some of the constraints on ICT use relate to national guidelines and legislation in an affluent western country, a larger-scale study would be able to highlight significant regional and national distinctions, and variations in practice.

## Conclusion

This study was original in that it focused on the ICT and Web 2.0 use of a specific age group, children aged 10-11, rather than on a broader cross-section of children or young people. By doing so, it has demonstrated that pre-teens' use of ICT is distinctive because it is shaped by age-related constraints on finance, on control of technology, on

monitored use of technology and on the skills necessary to make effective use of sites and resources. These constraints, in turn, are influenced by awareness of changes in official and legal age restrictions at the ages of 12 and 13.

These findings are significant for future research because they emphasise that the primary/secondary school boundary cannot be assumed to constitute a major shift in children’s use of ICT, particularly in relation to informal learning. Sampling, data analysis and reporting around this boundary all need to be fine grained in terms of age groups – the experience of one age group cannot be taken as representative of another, even when the age gap is only a couple of years.

Pre-teens use ICT and Web 2.0 outside school to support enquiry, development of new literacies, collaboration and publication. In doing so, they are limited by their evaluation skills. This is significant for practice within formal education. The messy realities of primary school life mean that access to online tools and resources is currently limited, but these imitations need not restrict the teaching of skills relating to evaluation and to the related area of critical thinking. It is important that children know how to gauge the reliability and credibility of a website or resource, that they understand how search engines rank sites, that they can investigate the measures in place to increase the trustworthiness of a wiki or other Web 2.0 site, and that they understand the various reasons why access to particular sites is limited within school and within the wider society.

Also significant for practice in formal education is children’s widespread use of communication technologies outside school. If schools are legally required, as they are in England, to make use of ICT in various subject areas, then it is important to acknowledge the current restrictions on the teaching and use of communications technologies. Some schools are beginning to address these issues through a ‘bring your

own device' (BYOD) approach, but many others ban the use of communication technologies such as phones and games consoles within school time. One way forward would be to acknowledge the use of these technologies outside school, for teachers to draw attention to their potential for supporting collaborative learning, to provide opportunities for children to share their experience of using these technologies to support informal learning, and to encourage and support the use of these technologies when engaging with shared homework tasks or when participating in school trips.

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Figure 1: Elsa: Visiting a variety of sites to find the best price available for a book purchase  
460x345mm (180 x 180 DPI)





Figure 2: Animation programmed in Scratch by Manvinder and Ajay and then uploaded to YouTube  
240x195mm (72 x 72 DPI)

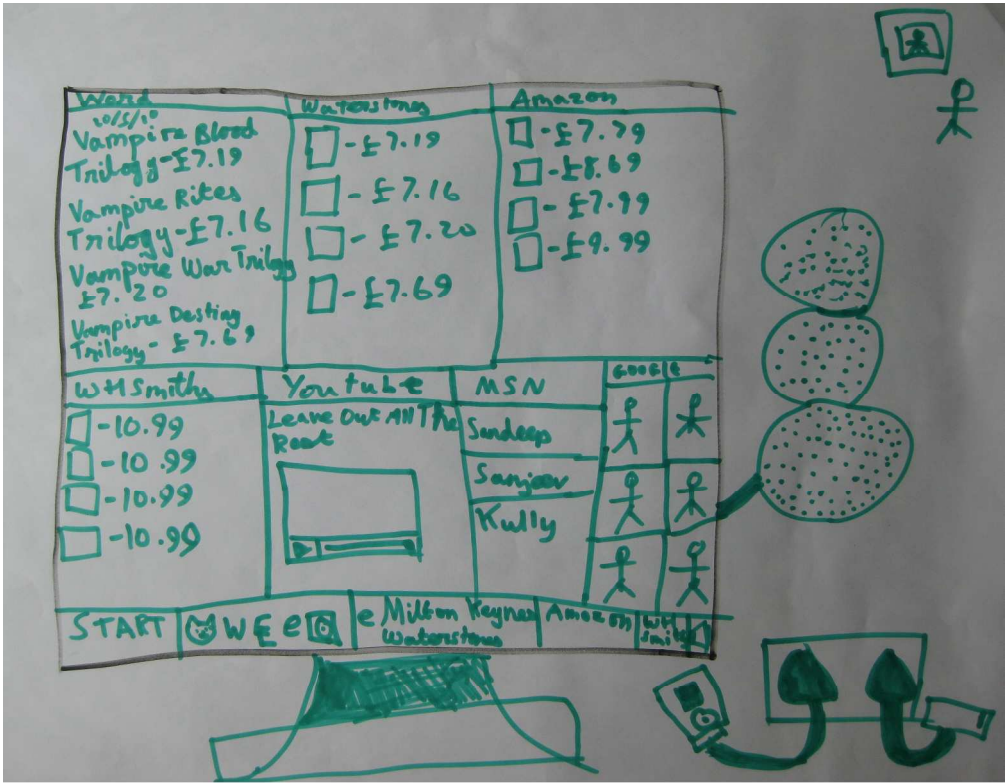


Figure 3: Manvinder compares prices online, chats on MSN and charges his iPod and Nintendo DS while his brother (top right) watches television nearby  
1069x831mm (72 x 72 DPI)

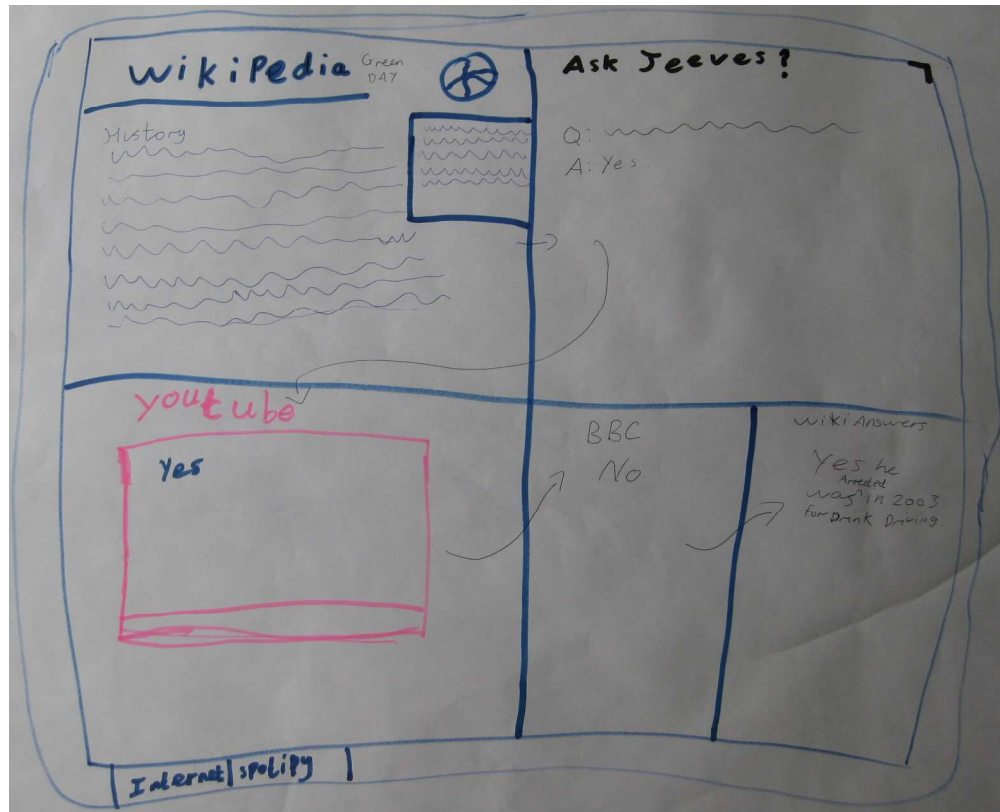


Figure 4: David used Wikipedia, Ask Jeeves, YouTube, the BBC and Wiki Answers to investigate whether a singer had been arrested. He reported that only the BBC had given the answer 'No'

899x729mm (72 x 72 DPI)

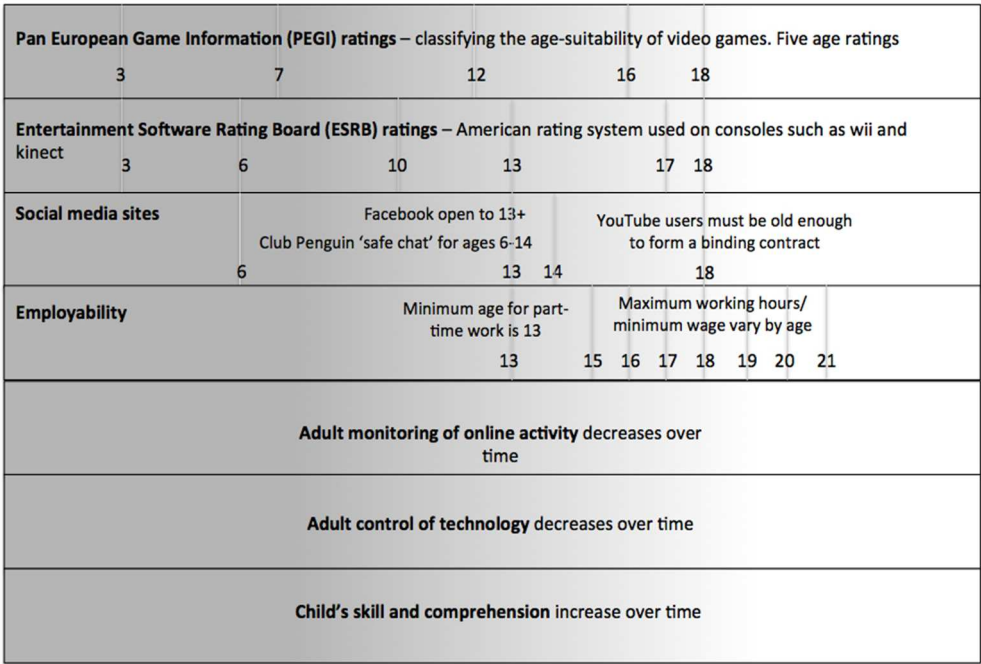


Figure 5: Constraints on pre-teen use of ICT and Web 2.0. The four rows at the top of the figure include vertical lines indicating age-specific changes in restrictions, the lower three rows represent gradual changes as children approach adulthood.  
325x219mm (72 x 72 DPI)